US-PAT-NO: 3742130

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TITLE: TELEVISION RECEIVER INCORPORATING SYNCHRONOUS DETECTION

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Brief Summary Text - BSTX (19):

In accordance with another aspect of the invention, the phase lock loop incorporates the high frequency oscillator operating to bring the intermediate frequency carrier into synchronism with the synchronous oscillator. When the reactive components in the tuned circuit of the synchronous oscillator and the reactive components forming the intermediate frequency filter are batch fabricated together, their errors may be made largely self-cancelling when one adjusts the frequency of the IF signal to fit their frequency characteristics. This feedback arrangement minimizes the need for adjustment of the respective tuned circuits either during initial fabrication or

subsequent use.

Detailed Description Text - DETX (12):

In a preferred form, the "lumped" selectively IF filter 39 is batch fabricated by a printed circuit technique wherein inductors and capacitors are printed on two surfaces of a dielectric sheet or substrate. Since the frequency of the intermediate frequency filter 39 approximates the frequency of the local oscillator used in the subsequent synchronous detection process, the tuned circuit for the detector oscillator may also be similarly constructed and may be formed adjacent to the filter elements on the substrate so as to achieve a closer match of their respective frequencies.

Detailed Description Text - DETX (19):

As indicated, the four quadrant multiplier 44 produces a d.c. voltage indicative of the difference in phase between the applied intermediate frequency signal and that of local oscillator 42 for automatic frequency and phase control. This voltage may be filtered in low pass filter 45 to remove higher frequency terms and noise and is amplified in the

automatic frequency
control amplifier 46. In the preferred embodiment illustrated in FIG. 1, the
oscillator 42 is left uncontrolled by this feedback network and the active
control connection is made to the high frequency oscillator 33 or 36. The
oscillator 42 should be stable, however, and is made to have a natural
frequency closely matching that of the intermediate frequency filter 39. Exact
synchronism in frequency and phase between the intermediate frequency signal
and the intermediate frequency oscillator is produced by automatic frequency
and phase control of the high frequency oscillators 33 and 36 in the tuner 11.
By this strategy, the intermediate frequency signal is made to conform to the
phase of the synchronous oscillator 42, rather than vice versa.

Detailed Description Text - DETX (28):

The detected video signal is processed by a chrominance demodulator 17, a
luminance amplifier in chip 18, a matrix 19 and separate video drivers 20 which
are coupled to the individual color grids of the cathode ray tube 21. The
chrominance demodulator and amplifier 17 may take the

form of a single chip fabricated by an IC technique. The luminance amplifier 18 may consist of one or two stages of video amplification since the gain requirement is small and may form a portion of the IC control chip 18. Since the chrominance signal is not preattenuated the customary 10 to 12 db prior to application to the video detector, it also emerges at a level approximately equal that of the luminance components, thus reducing the need for compensatory reamplification prior to demodulation. The demodulated chrominance signal which appears at the output of the demodulator 17 in the form of a pair of color difference signals is then mixed in the matrix 19 with the amplified luminance signal from 18 to obtain the separate R, G and B color signals. The color signals are then separately amplified in 20 and applied to the grids of the picture tube. The high power requirements for the individual video amplifiers of 20 normally dictate use of discrete active devices rather than IC fabrication.

Detailed Description Text - DETX (41):

The differential amplifiers 61, 62 provide the voltage gain of the

intermediate frequency amplifier, each having approximately 30 db of gain. The buffer amplifiers 63, 64, 65, 66, 67, 68 serve the primary function of buffering the individual differential amplifiers by providing a high input impedance and low output impedance. They do not directly contribute to the voltage gain of the amplifier. The purpose of this arrangement is to keep the gain essentially flat from low frequency (2 mc.) through the IF frequency (46 mc). If this is not done and there is appreciably more gain at frequencies below IF, then the detector can be overloaded with low frequency noise.

Normally, this is not of concern in conventional IF amplifiers which provide for band shaping of some sort with each gain stage. In the design of broad band <u>IC</u> gain blocks, chosen to reduce the need for continually going on and off the chip, control of the out of band gain is an additional consideration.

Introducing emitter followers between gain stages prevents the decreasing input impedance (with increasing frequency) from appearing across the resistive loads in the output of the previous stage, thus keeping the IF gain flat over an extended range.

Detailed Description Text - DETX (60):

In particular, the IF filter 39 need not contain any within-the-channel traps for the sound or chrominance components but may apply sound, chrominnance and luminance to the synchronous detector at the same relatively high signal levels. By transforming the signal components within the selected channel to base band, the synchronous detector transforms these components to a frequency domain in which the components may now be more advantageously separated. Typically, the low pass filter at the output of the I detector may consist of a single filter capacitor which strongly attenuates the second harmonic of the IF frequency at 88 megacycles. Its roll off will only slightly affect the upper limits of the detected signal. The chrominance high pass filter may consist of an undersized coupling capacitor. No other input filter is necessary to remove the luminance components from a chrominance detector of the type described in the cited Abbott patent. Filtering at the output of the chrominance detector may also consist of simple low pass RC networks. The luminance amplifier may

**operate with simple low pass RC filters at the input and/or the output. Thus,
expensive or complicated networks may be completely avoided in achieving signal
separation within the channel. Furthermore, filtering at base band is readily
achieved with IC fabrication technology.**